

What is claimed is:

1. A direct-conversion demodulator in a RF reception system for radio communication comprising:

a down mixer for mixing a received RF signal and carrier signals so  
5 that a phase difference between the received RF signal and carrier signals may be  $90^\circ$ , and thereby converting the RF signal into baseband signals of channels I and Q having a phase difference of  $90^\circ$ ;

a filter for filtering high-frequency components of the baseband signals of the two channels output from the down mixer;

10 a detector for detecting a gain control level corresponding to a difference obtained by comparing levels of the baseband signals of the two channels detected by the filter with a predetermined level;

an AGC for controlling gains of the baseband signals for each of the two channels output from the down mixer according to the gain control level  
15 detected by the detector;

a differentiator for differentiating the baseband signals of the two channels output from the filter;

a multiplier for cross multiplying the baseband signals of the two channels output from the differentiator and the baseband signals of the two  
20 channels output from the filter; and

an adder for adding the baseband signals of the two channels multiplied by the multiplier and thereby detecting data.

2. The direct-conversion demodulator according to claim 1,  
wherein the detector comprises:

a multiplying unit for multiplying the baseband signals of the two  
channels with themselves;

5 an adding unit for adding the baseband signals of the two channels  
multiplied by the multiplying unit and thereby detecting the levels of each of  
the signals; and

a level-comparing unit for generating a gain control level  
corresponding to the difference obtained by comparing the levels of the  
10 signals detected by the adding unit with a predetermined level.

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A<sup>2</sup>